NEWTON (Wm K.)

SANITARY CONTROL

OF

THE FOOD SUPPLY.

BY WILLIAM K. NEWTON, M. D.,

HEALTH OFFICER OF PATERSON, N. J.

[*Read at the last meeting of the American Public Health Association. Published by permission of the author.*]

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SANITARY CONTROL OF THE FOOD SUPPLY.

There is no one subject more intimately connected with our every-day life, and about which so much has been written and published the past few years, as the condition of our food supply. The columns of medical, sanitary, and chemical journals, and the reports of state and local boards of health, have been crowded with essays on food adulteration and plans for checking it; and the popular papers have teemed with the horrors of the subject, each trying to vie with the other in furnishing the latest meal of adulterated articles, till, if we believe the sensational stories of these alarmists, we wonder why there are any people left to tell the tale.

It may seem unnecessary, or even presumptuous, then, for me to offer any remarks on this topic, and a less hackneyed theme might appear to be more profitable; but it is my aim to review the work that has been done in the way of investigating and regulating the food supply, and to draw attention to some novel phases of the question.

My purpose is to look at the relations of boards of health to the food supply, and I shall endeavor to trace out just where these relations begin and end; and I shall show, by the evidence so far offered, that a line may be closely drawn between harmless adulterations and those which are injurious to the public health. Your attention will be called finally to a class of foods

of animal origin which need constant supervision on the part of our sanitary authorities.

It will be well at first to notice the regulations in force which aim to check adulteration, or to prevent the sale of injurious articles of food.

In Germany, Austria, France, and other European countries, laws have long been in existence controlling the manufacture or sale of articles of food. These laws are either general, or are merely local police regulations. There is hardly a city or municipality on the continent which does not more or less efficiently look after the quality of foods, and endeavor to insure purity.

It would extend the length of this article beyond reasonable limits to mention the custom in each country; and the forms of government are so different from ours, that they would not be applicable here. We can derive more benefit by following the efforts made in English speaking countries.

ENGLAND.

The first attempt made in England in modern times to enact laws bearing on adulteration was in 1860 (23 and 24 Vict., *c.* 84), but a comprehensive law was not passed till 1872 (35 and 36 Vict., *c.* 74). The statute now in force became a law in 1875 (38 and 39 Vict., *c.* 63), and was further modified in 1879. It is upon these recent English laws that those now in force in the United States were based.

The general plan followed in Great Britain is as follows:

Public analysts are appointed by each parish, borough, or town government, and are required to analyze a number of samples as fixed upon each year, for which a stated sum of money is paid. Thus, an analyst in a certain rural district is required to analyze a stated number of samples of milk, bread, spices, and so on, and either a lump sum is paid for the work, or the price for each article is fixed upon. This plan limits the amount of work expected of each man.

Inspectors of nuisances, appointed in the same manner as the analysts, are required to collect the samples, and if the certificate of the analyst states that they are adulterated or sold in violation of the food adulteration law, the inspectors shall make complaint before a magistrate, who tries the case.

A portion of the sample is always reserved, and, in case of appeal from the decision of the analyst, is sent to chemists at Somerset House.

It will be seen by this outline that the amount of work done depends altogether on the local government. If that body be penurious, or lacking in sympathy with the work, little can be accomplished. Hence a great drawback to this system lies in the method of regulating the amount of work required of the analyst. If that official was paid a stated salary, and should analyze all samples left with him, more headway would be made; but for reasons of economy the other plan is followed.

The appointment of an analyst is made obligatory on the local government; but while these appointments are made in every case, in many instances no work is given them to do. In 1882 three counties and forty-two towns did no work under the act whatever.

For these reasons the results obtained under the law, which will be noted further on, do not accurately represent the condition of the food supply of all parts of Great Britain.

Besides this food adulteration law, there are other acts of a very salutary character in force: among these may be mentioned the bake-house acts, slaughtering acts, and acts relating to dairies.

CANADA.

In Canada a law was enacted January 1, 1875, but work was not begun till 1876. As there are peculiar, and what appears to the writer desirable, features in this law, a somewhat detailed description will be given of the methods employed under it.

The law is moulded after the English laws, but the machinery for its enforcement is different. The latter is under the charge of the Department of Inland Revenue, a branch of government analogous to our Internal Revenue Department. This department has the supervision of inspectors and analysts, and collects the revenue on liquors and other articles. The department has control not only over manufacturers and compounders of liquors, but is brought into intimate relations with all branches of trade. This is of great advantage, for, as will be seen later on, articles used for the purpose of adulteration are very rarely injurious to health, but are added to foods in order to cheapen or defraud;

hence the adulteration laws are trade and not public health measures, and should be under the charge of some department of government other than health boards. This opinion seems to obtain in Canada, for the law is treated as a commercial one, and is not considered from a sanitary stand-point.

To return to the method of management:

The governor appoints one or more analysts for each revenue district. At present there are six, one for each of the following cities and districts: Halifax, Montreal, Quebec, Toronto, St. John's, and London. The officers of inland revenue, the inspectors of weights and measures, and the inspectors of food, are authorized to procure and submit to the analysts samples of food and drugs, and upon receiving a certificate from the latter official stating that the article in question is adulterated, the inspector is authorized to seize and destroy it. This latter penalty, however, is rarely enforced. The expenses of analyses in case of prosecution are added to the costs, and are paid by the convicted person; but in case no prosecution is made, the costs are paid by the government.

There have been very few prosecutions, the department depending on the publication of the name of the culprit as a form of punishment.

The analysts are paid by a retaining fee of $200 per annum, an allowance for the first year for laboratory apparatus of a sum not exceeding $300, by an allowance of $100 for rent, and by payments of fees until the total amount shall have reached the sum of $2,000 per annum. The fees allowed are reasonable. The commissioner of inland revenue apportions each year the amount of work expected of each analyst.

I ask you to bear this outline in mind, for we shall show that the results attained under this system have been very encouraging.

UNITED STATES.

In our own country many states have had for many years scattered clauses in their statutes relating to the adulteration of foods, and prohibiting the sale of dangerous meats, etc. Thus, the older states of Massachusetts, New York, New Jersey, and others, had laws forbidding the sale of adulterated foods, milk, medicines, liquors, and unwholesome provisions. Nearly every

state has a purely commercial system for inspection of flour, bacon, lard, salt, etc., but these restrictions apply only to weight and other trade qualities.

It was not until 1879 that any attempt was made to propose a carefully prepared law applicable to each state. It had long been known to merchants that the frequent adulterations of food were not only injuring trade, but were damaging the credit of the dealers. Hence in that year a prize of $1,000 was offered by the National Board of Trade for the best essay on adulteration, and for the best form of a law prohibiting the same. As a result of this contest a law was drawn up by careful and competent men, and attempts were made to have it enacted in the various states. This has been successful in but three states.

The law recommended by the committee of the Board of Trade was adopted by the legislature of New Jersey on March 25, 1881; by the New York legislature later in the same year; and was passed in Massachusetts, with slight modifications, in 1882.

A copy of the law, changed so as to be applicable to the territories and other sections of the country under the charge of the general government, was presented to the last congress, but, not receiving the support it was entitled to, failed to pass. A law prohibiting the importation of damaged and adulterated tea was enacted, however, and much good has been accomplished under its provisions.

A brief outline of the state law may be of interest, as parts of it are uniform in New Jersey, New York, and Massachusetts. It begins by defining what is meant by adulteration in the case of food or drugs; gives the state boards of health power to exempt from time to time certain articles, and also exempt certain mixtures or compounds recognized as ordinary articles of food, "provided the same are not injurious to health." The act further requires that the State Board of Health "shall take cognizance of the interests of the public health as it relates to the sale of food and drugs and the adulteration of the same, and make all necessary investigations and inquiries thereto." The board is also to appoint analysts and inspectors.

Each state has adopted rules and methods of procedure peculiarly its own. These we shall now notice.

NEW YORK.

In New York $10,000 was appropriated in 1881 for the work of investigation. In 1883 $30,000 was voted by the legislature for the purposes of the law, but this was stricken from the budget by the governor; hence the work of the board has been very much crippled.

In 1881 nine analysts and four inspectors were appointed to carry out a system of investigation. An immense amount of work was done, and a series of exceedingly valuable reports was presented to the board by this corps. These reports will be referred to later on.

As to the actual prosecution of dealers in adulterated foods, very little has been done. A few complaints have been made in cases of the sale of impure cream of tartar, and varying results obtained, some of the cases being taken to the higher courts. An important suit against importers of damaged and adulterated tea is now in the courts, and at present writing remains undecided.

NEW JERSEY.

In New Jersey $600 was appropriated by the legislature in 1881 for the purposes of the act. Six analysts were appointed by the State Board of Health, to report on the condition of the food supply in the state, which was done, and the results printed in the fifth annual report of that board.

In 1882 the legislature failed to make any appropriation, and little or no work was done in that year. In 1883 the law was very much changed, and an annual fund of $1,000 provided for. Four analysts were then appointed, and are prepared to analyze all samples sent to them.

The legal proceedings were altered to conform to the general public health law of the state, and to provide for summary trials without a jury. Authority was given to any analyst or inspector, or any officer of a local board of health, to inspect articles of food wherever exposed for sale; and if, upon inspection, an article shall prove to be adulterated, the officer is empowered to prohibit the sale or disposal thereof till decision shall be given by the court before which the defendant may be brought. This provision has been adversely criticised, but the reason for its

existence is patent to any person conversant with the principles of sanitary law. If an article is injurious to health, its sale should be prohibited, and the health officer should be empowered to prevent the use of such food; for, if one has to await the results of a trial, in many cases very protracted, the very object of a public health measure is defeated, and the offender not punished until great harm has been done. This principle is upheld by another law in New Jersey (the milk adulteration law), which will be discussed further on. In that law the inspector is authorized to destroy impure milk wherever found, and thus prevent any harm to the public health by such a dangerous article of food. The only prosecutions under the food law in New Jersey were against dealers in impure milk at Newark, but as no decision has been given by the higher courts, little can be said as to its strength.

MASSACHUSETTS.

The State Board of Health in this state has appointed two analysts,—one at a salary of $1,500, and the other at $1,000 per annum. The first has charge of the investigation of articles of food, the latter of drugs. No provision has been made for inspectors, but the analysts have to obtain the samples themselves. The analysts are not only to investigate the condition of the food supply, but are to designate such articles as shall be exempt from the action of the law, and also to fix standards of purity for future use. No reports of the investigations have been so far published.*

As to the value of these laws, and whether they will withstand the assaults of acute lawyers retained by rich defendants, little can be said, for no real test has been had; for only a few cases have been tried in the petty courts of New York and New Jersey, and the law points have not been argued before the higher courts.

As to the form of the laws, it is held by so eminent an authority as Dr. E. R. Squibb, that in "aiming to be concise, compact, and brief, they are too general and too loose for any very clear comprehension by the adulterators, to whom they are really addressed. The law seems to address itself to the ana-

* Since this was written, prosecution has been begun, in Boston, in cases of milk adulteration.

lysts, lawyers, and courts, and generalities leave too much room for protracted legal proceedings and technicalities, all of which involve well known chances of escape for defendants."*

Another point: This law, on its very face, bears the stamp of being a trade measure; and it is not until we reach the clause where it states that state boards of health "shall take cognizance of the public health in so much as relates to injurious foods," that we know the sanitary bearings of the statute. In truth, if health boards are to take cognizance of adulteration only when it affects public health, the problem would be very easy of solution, and sanitary authorities would be rid of many duties that are thrust upon them, and not properly belonging to their sphere. But as interesting as this discussion is, we must leave it for the present.

SPECIAL LAWS.

A few states have special laws bearing on this subject. Thus, New York has a law intended to compel dealers to sell oleomargarine and lard cheese for what they really are, but it has never been enforced. Massachusetts has a statute authorizing cities and towns to appoint milk inspectors, and prohibiting the adulteration of milk. Boston is the only city working under it, and more or less efficient work has been done.

Last year, 1882, the vinegar makers of that state came to the conclusion that their trade needed protection from adulterators, so they were presented with a law regulating the sale of vinegar, forbidding the addition of any foreign acid, and authorizing the appointment of inspectors of vinegar. The inspector of vinegar for Boston has been working up the subject, and regrets the "deficiently drawn statute." He has done much to enlighten us as to what vinegar is, and what are its adulterants.

Rhode Island also impowers cities to appoint milk inspectors, and forbids the sale of impure or impoverished milk. The city of Providence has done excellent work under this law, and has reduced the sale of impure milk to a minimum.

New Jersey has given her people protection against adulterated honey, lard, liquors, and milk, but no one ever knew a person to be prosecuted for selling either of the three first men-

* *Ephemeris*, No. 1, p. 24.

tioned articles. An active warfare has been waged, however, for the past four years, under the milk law, and as it has some novel features it will bear review. This law was originally drawn up as a purely commercial measure, for the purpose of enabling honest farmers and dealers to sell a pure article, and also to protect them from the evil practices of creameries and other adulterators. Provision was made in this law for the appointment of an inspector of milk for the whole state, but the honest farmers did not know whom to trust with the appointment. They could not depend on the politicians, for the office would then become one of the spoils of party; so in their adversity they bethought them of the State Board of Health, when, presto, the commercial law was transformed into a public health measure, and the bantling was turned over to the care of that board. And it has proved a public health measure in fact, and clearly defines what pure milk is.

I will mention a few of the principal points in the law: Milk from which the cream has been removed can only be sold from cans marked in letters two inches high "Skimmed Milk." The sale of adulterated, impure, or unwholesome milk, or the milk from cows kept in a crowded or unwholesome condition, or diseased, or fed on unwholesome food, or upon distillery waste or other rotten substance, is forbidden. The addition of water or any other substance is declared an adulteration. Milk which has been exposed to or is contaminated by the exhalation from any person sick with any contagious disease shall not be sold. For the purposes of this act, milk shall be considered as adulterated when it shall contain less than 12 per cent. of milk solids.

Cases of violation are tried before a court in a summary way, without a jury, and a certificate of an analyst that the milk did not conform to the state standard is sufficient evidence. Under this act, the State Board of Health appoints annually a state inspector of milk, who has power to appoint assistants, and also to inspect milk wherever found, and if it is adulterated or impure he is authorized to destroy it. The state has expended from $1,000 to $1,500 a year on this special work.

Besides these general and special laws, there are many local ordinances or sanitary codes which govern and provide for the work of inspection in the larger cities. Nearly all of our cities

make some provision for market inspection, but in most instances the very flagrant violations of law, such as the sale of bad meat and stale vegetables, only are dealt with. In some cities,—New York, Brooklyn, Cleveland, Cincinnati, and others,—the milk inspection is carried on in a very vigorous manner. Thus, in New York city, the warfare carried on during the past few years against impure milk has done incalculable good.

It will be interesting now to review these laws, and note the method of enforcement employed.

In France, the work appears to be done by the police officers of the various cities.

In England, the parish, town, or municipal boards have control, and appoint the officers. These boards are not comparable with our boards of health, as is sometimes supposed, but they are analogous to our borough, town, or village governing bodies. They not only have charge of sanitary matters, but care for the paupers, disburse alms, lay out streets, etc.

Canada places the control of the adulteration laws in the hands of the Inland Revenue Department, a branch of government brought into intimate relations with trade, and hence in a position to know the rules and requirements of trade.

In the United States we have departed from all beaten tracks, and have turned over to state and local boards of health all adulteration laws so far enacted. This has been done for two reasons,—first, because there is no other department of government to which these laws could very well be directed; and, secondly, because a few articles of food are so adulterated as to be injurious to health or life, it is argued that all sophistications are dangerous. This assignment of a duty not distinctively and positively applicable to health boards is unfortunate, for these boards have even more than they can do now, with the things which properly belong to them. And from a multiplicity of duties thrust on us, we are apt to neglect some matters of greater importance to the public health and weal.

I will not deny that there are articles of food which need the constant watch-care of sanitary officials, but they are few in number, and are mostly of animal origin. Of these I shall speak later on.

I am again tempted to quote from Dr. E. R. Squibb. He has

devoted years of his life to the fight against adulteration in all its forms, and his mature opinion is well worthy of our consideration.

He says that the objects of the adulteration laws are as follows: "First, to deter persons from practices of adulteration; second, to detect such practices; and, third, to punish them. All these combine to prevent adulterations. But the first is by far the most important element, and that which requires greatest emphasis, because it is the most radical in its influence and most economical in its effects. The motive power of all adulteration is pecuniary profit or gain, and not to endanger or damage health at all. And that adulterations do endanger health is a mere accident, that most adulterators strive to avoid by rendering their adulterations as harmless as possible. Therefore it is that all adulterations are mere dilutions and substitutions in the interest of pecuniary profit or gain, and if they are ever positively hurtful, it is by accident and not by design; and hence adulterations are simply frauds, cheats, or deceptions to make money by, and they are studied out and designed in this one single interest before they are put into practice. Now, when a law can come in effectively between the motive and the act, to deter from the act, it is then nearly perfect, since there is nothing then to detect or punish, nor any work for the analysts or the courts at all, no expense to the governments, and therefore no taxes upon the people for enforcing the law, to say nothing of the moral effects of restraining from vicious practices." He then says that if the law is to be operative between the motive and the design, it should be drawn in full and plain language. "If the penalty be sufficient, and sufficiently sure to make the risk of punishment greater than the profit will warrant, the design to adulterate will be abandoned, and the law will have its natural and wholesome success."*

Whether the laws that we have reviewed will come up to Dr. Squibb's standard I leave you to judge.

I am afraid that we place too much trust in laws themselves. Some people with whom I have talked on this subject seem to labor under the delusion that the moment a law is placed on the statute-books a moral revolution takes place, and that the end

* *Ephemeris*, No. 1, p. 24.

sought for would be attained without more trouble. I once had great faith in laws myself, and believed that because a certain law, calculated to do great good, and in itself a beneficent measure, said so, and so must be the case, that all the courts and lawyers would bow to its dictum. But one hour on the witness stand, and two hours of talk from the lawyer on the other side of the case, dispelled the delusion, and I came to the conclusion that there was no such a thing as justice any more.

With this experience in mind, I would say that the only way to prove the value of our food laws is to enforce them vigorously, and if they come out of the fiery ordeal of the courts unscathed we shall be extremely fortunate.

We will agree that there is a necessity for laws such as these to forbid adulteration, and whether trade or public health is paramount they should be enforced without fear or favor; and if it is deemed the duty of health boards to execute them, let us bow to the demand, and do the best we can.

RESULTS OBTAINED.

Now that we have glanced at the various laws, and the machinery employed to enforce them, let us see what has been accomplished by investigation and prosecution. Let us look over the field, and see if we can discover what articles are adulterated, and what is the character of the adulteration. Has the vast expenditure of money and time revealed anything, or has it all been spent for naught? If it be proved that our food supply is not harmfully adulterated, or if we can draw the line between sophistications which touch only the pocket and those which endanger health and life, we must acknowledge that the thousands of dollars spent in the work have not been wasted, but have given us ample returns for the investment. The amount of evidence bearing on food adulteration at our command to-day is enormous: the great difficulty with which we have to contend is to properly use it. But we shall endeavor to present it unbiased and unprejudiced.

First, let us see what is the prevalence and what the proportion of adulterated food, and then note the effect of prosecution and investigation thereon.

As to continental Europe we can say but little, for the records

are so scattered and the laws so multifarious that we have but a trifle to offer. In France, to judge from the published reports, chemists note articles as good, bad, passable, not injurious, and injurious. Thus, in March, 1883, out of 1,118 articles examined at the Paris laboratory, 271 were returned as good, 231 as passable, 616 as bad, 545 of which are "not injurious," and 71 "injurious." It is difficult to tell just what is meant by these terms, and as we are not informed which are pure and which adulterated, no opinion can be formed. Wines form by far the largest number of articles examined, and from the report we judge that the Parisian gets very little pure wine. Of 257 samples of milk, 26 are returned as good, 116 as passable, and 115 as bad, but not injurious.

GREAT BRITAIN.

Year.	Number analyzed.	Per cent. adulterated.
1875–6	15,989	18.10
1877	11,943	17.70
1878	15,107	16.58
1879	17,574	17.25
1880	17,919	17.47
1881	17,868	16.56
1882	14,900	16.50

These totals do not represent foods exclusively, for drugs, wines, spirits, and beer are included; nor do they indicate the state of the food for the whole of Great Britain, for, as before stated, in many parts of the country no work is done under the act.

It will be seen, by glancing at the figures, that five years' work, from 1877 to 1882, has only reduced the amount of adulteration 1.2 per cent. When it is remembered that a vigorous prosecution has been kept up, we are compelled to acknowledge that the results are not very encouraging.

Selecting a few articles from the list for purposes of comparison, we find that of the samples of milk analyzed the per cent. adulterated varied from 26 in 1877 to 20.35 in 1882; butter, including oleomargarine sold for butter, 12 to 15 per cent.; groceries, 13 to 10 per cent.; bread and flour, 6.84 to 4.32 per cent.

CANADA.

Canada shows by far the best results obtained by any country, and the reduction in the amount of adulteration has been made by but little prosecution. The only form of punishment indulged in is the publication of the names of the dealers in impure articles. In 1876, when the work was begun, 51.66 per cent. of the articles examined were adulterated. In 1882 this figure is reduced to 25.66, showing an improvement of a little over 25 per cent.

UNITED STATES.

As there has been little or no prosecution in the United States under the food laws, but little has been done in the way of a reduction of the percentage of adulteration. In New York and other cities, and in New Jersey, the sale of impure milk has been reduced markedly; but there is still much work to do.

If we look over the reports of the analysts of New York, New Jersey, Massachusetts, Michigan, and other states, we obtain a fair idea of the prevalence of sophistication in this country. We find that the staple articles, such as are found in the average household, suffer adulteration about as follows: Spices and condiments, 66 per cent.; ground coffee, 45 per cent.; tea, 48 per cent.; sugar, the higher grades rarely, the lower grades 20 per cent.; syrup, 50 per cent.; milk, when not inspected, 50 per cent.; flour, none; bread, about 2 per cent.; cream of tartar and baking powders, 44 per cent.; butter, 40 per cent. (other fats substituted); vinegar, rarely adulterated, but rarely cider vinegar; olive oil, 60 per cent.

CHARACTER OF ADULTERANTS EMPLOYED.

Spices and condiments, adulterated with exhausted spices, ground cereals, flour, buckwheat hulls.

Coffee, with chicory, rye, and other cereals.

Tea, with exhausted leaves, leaves of other plants, damaged teas, coated to improve looks.

Sugar, with grape sugar.

Syrup, with grape sugar—in many cases all glucose.

Milk, with water, alkaline salts to neutralize acidity, preservatives, and is often skimmed.

Bread, alum added to increase whiteness,—rarely used in this country.

Cream of tartar and baking powders, gypsum, starches, and "fillers," to increase bulk.

Butter, other fats substituted for it or adulterated with foreign fats.

Vinegar, rarely adulterated, but often not fruit vinegar.

Olive oil, peanut and cotton-seed oil.

It will be noted, after glancing over this list, that the staple articles in every-day use are never adulterated with injurious substances; and the evidence thus far offered indorses the statement made in the first part of this paper, that adulteration is a sin against the pocket, and extremely rarely against health.

A group of substances which may be classed together, and, strictly speaking, not adulterations, but which are often used for the purpose of sophistication, will now be considered.

OLEOMARGARINE.

It is difficult to say whether this may be put in the category of articles to be placed under the watch-care of sanitary officers. Some have held that there is danger of animal parasites or diseases being introduced into the economy by the use of this article, but the best authorities deny this statement. Personally, I am of the opinion that it should be classed with the commercial frauds, but that its manufacture should be watched carefully by health officers. You are so familiar with the process of manufacture that it does not seem necessary for me to go into detail. Suffice it to say, that as the aim of the maker is to produce a sweet and merchantable commodity, any rancidity would interfere with its sale. This fact insures the public against any putrid or ill-smelling fat being used.

The quantity of this material sold and used as food in the United States is enormous. We may form an idea of the extent of the business when we know that three factories in New York state turn out not less than 4,500 tons a year, and there are some five or six more factories in the country. I venture to assert that a very small portion of this is sold to the consumer for what it really is.

We must recognize the necessity of some legal control over

this trade, and dealers should be compelled to sell the article on its merits, and not fraudulently. The enforcement of such a law does not belong to health boards, however.

"LARD CHEESE" AND "LARDINE."

An ingenious New Yorker has discovered that he can take milk robbed of its cream, and by the introduction of a foreign fat produce a cheese equal to an honest cream cheese. Lard and oleomargarine oil have been used in this process, and the resulting material is known as "lard cheese."

"Lardine" is an artificial butter made in nearly the same way.

Now if these articles were sold to the public on their true merits, no one would complain; but such is rarely the case, and if persons will insist on being thus defrauded, it may be argued that legal protection to the innocent purchaser is demanded.

GLUCOSE.—GRAPE SUGAR.

It is estimated that ten pounds of glucose *per capita* is made and sold each year in the United Stales; and we naturally ask, What becomes of it? No one ever heard of a person asking for the substance at a grocery store; yet it is sold and consumed somewhere. We can account for a large percentage of the substance in the syrups, strained honey, confections, and in the lower grades of sugar.

Attempts have been made to check or prohibit the sale of this article, which, as Dr. Squibb has it, "marks the progress of the age." The legislators of New Jersey passed a law in 1881 requiring that the manufacturers of sugar and syrup, who shall mix therewith any glucose or grape sugar, must mark the package with the word "adulterated," under a penalty of $500. This law came before Governor Ludlow for his signature, which he refused to affix. His veto message will bear quoting here, for it answers the question as to whether the substance shall be considered injurious or not. He says,—"The manufacture of glucose, or corn-sugar, is an enterprise yet in its infancy; it will, if successful, result in the utilization of the corn crop of the country, the increase of the sugar supply, and the conse-

quent employment of a large amount of capital and labor. Scientists of acknowledged ability and integrity have declared it to be a healthful article of food, and there is no reason why the result of its mixture with cane sugar should be marked 'adulterated,' as if it were a debasement or pollution." The legislature was satisfied with the governor's explanation, and did not enact the law.

Frequent statements have been made that sulphuric acid has been found in large and poisonous quantities in the glucose syrups. This is either a perversion of facts, or an exaggeration. It is true that sulphuric acid is employed in the conversion of starch into grape sugar, but the acid is afterwards neutralized by means of milk of lime. If any acid exists in the syrup, it is either in combination with the lime, or free and in very small quantities,—a condition strenuously avoided by the manufacturers.

It may be said, without fear of contradiction, that glucose may be considered a harmless article of food. As to the use of this article as an adulterant, I hold that it does not come under the jurisdiction of health officers.

CANNED FOODS.

There is sufficient evidence to warrant us in asserting that fruits, vegetables, and meats preserved in tin need our attention. Many cases of acute poisoning, of greater or less severity, have been reported by competent observers.

It has been proved that some fruits and vegetables act upon the tin or lead, and enough of these metals is dissolved to cause serious illness. This is especially true of the very acid fruits, such as apples, cherries, and vegetables like tomatoes.

One case has come under my notice, where two persons were seized with an attack of vomiting, purging, and cramps, after the ingestion of apples preserved in tin. I was fortunate enough to obtain the can and the remainder of the fruit. The interior of the can presented a crystalline appearance, such as is described by Wood and others who have investigated the subject. The fruit was acid in reaction, and analysis revealed tin in considerable quantities.

It has been suggested that only old and imperfectly prepared

fruits and vegetables cause trouble, and that to ensure the freshness of the article the year of canning should be stamped on the package. This subject needs thorough investigation.

As to illness being caused by canned corned beef and other meats, I can say that I have seen two cases, but the trouble seemed to be due to imperfect preservation, as the meat in both cases was partially rotten. Both cans were what is known in the trade as "swelled-head," that is, the ends were bulged out by air or gases in the can: hence these cases cannot be cited as being caused by canned meats by themselves.

PRESERVATIVES.

I wish to call attention to the use of preservatives, as the custom seems to be increasing. The subject should be thoroughly studied before a competent opinion can be formed as to the advisability of their employment. Those which I have examined have consisted of salicylic acid, either alone, or combined with soda, alkaline carbonates, potassium nitrate, and borax or boric acid. These are extensively advertised in glowing language, and with the usual accompanying certificates from chemists or physicians, and meet with ready sale. Many fanciful names are given to the compounds, and each is claimed to be "positively harmless."

My own opinion is, that their use should be discountenanced by sanitarians; for the mere fact that a certain chemical combination will check fermentation or putrefaction outside of the body leads us to believe that digestion will be impaired or impeded. This I have sought to prove in an imperfect way, by treating milk with a preservative, and then attempting artificial digestion. Digestion was proved to be interfered with, or checked altogether.

Thus far we have been discussing certain laws and duties relating to the food supply with which health boards may or may not properly concern themselves. Your attention is now called to a group of foods, and the trades connected therewith, which need the constant surveillance of sanitary officers. I refer to bread, milk, and meat, and the trades of baker, milk seller, and butcher, each one of which should receive the closest

attention of health officers. The importance of this branch of our subject is so evident that I shall go somewhat into detail in pointing out the line of investigation necessary.

BREAD.

The amount of adulterated bread sold in the United States is very small, certainly not one per cent. of the total quantity used. Alum is sometimes used to make bread appear white, but it is not a common practice. It may by prolonged use cause indigestion, and of course its use should be checked. But the health officers' duties do not end with the mere examination of bread for alum: he should carry on his inspection further, and into the bake shop, noticing the condition and surroundings of the place, and insist that there should be cleanliness in every branch of the business.

Bake-shops are generally located in cellars, and are very often damp, dirty, and foul-smelling, and if a person with a sensitive stomach should visit many of them, I am of the opinion that the demand for home-made bread would be increased. The very occupation of baker is apt to cause certain diseases of the skin of the hands, and although no illness may be caused by it, it is not pleasant to think of our bread containing the scales or scabs from eczema.

To give a leaf from the history of a few visits to bake-houses may interest you, and impress upon your minds the importance of the sanitary control of such places.

Most of the places visited were in damp, dark cellars, where artificial light is constantly used. In one place we find the cat and dog asleep in the kneading-trough, fowls running around and perching on the various utensils, and a general air of filth and lack of thrift. In one shop the kneading-trough was connected with the sewer by means of an untrapped waste pipe. In another the soil pipe had burst, and the floor was flooded with liquid filth. The baker said that "that always happened after a rain-storm." I have seen a baker mixing his bread with hand and arm covered with the eruption of eczema. He said that "the doctor told him the dough was good for the disease." But he would say that the quality of the bread was not improved thereby.

The custom of using bake-shops for sleeping-rooms is very common, and must be discountenanced.

I would insist, then, on the necessity of frequent inspections of bake-houses, in order that cleanliness should be insured.

MILK.

When we consider that milk is universally used, and that it constitutes almost exclusively the diet of children at that time of life when they are least able to resist any interference with the purity of their food, we are forced to the conclusion that strict measures should be adopted by every health authority to insure that condition of the supply necessary for good health. It is pleasant and encouraging to know that this is acknowledged by most sanitary officers, and that more or less efficient work is done by a great number of health boards to check the sale of impure milk.

But the mere inspection of milk for the purpose of detecting adulteration, although most commendable, does not go far enough, and is not in itself sufficient. The watchfulness of health officers should go much further, and should extend to the dairies from which the supply may come. This I shall insist on, and shall state cogent reasons for demanding it.

We are in a position to assert that the adulteration of milk is confined almost exclusively to the addition of water, preservatives, and alkalies, and to the abstraction of cream. These adulterants are not in themselves injurious to health; but when we know that the nutrition of an infant is seriously interfered with by the impoverishment of the milk given it, we see wherein harm may be done.

Besides checking the sale of adulterated and impoverished milk, the inspector should be on the lookout for milk from dangerous sources, some of which I shall now indicate.

Milk produced by improper feeding.—Distillery waste, and sometimes beer grains, produce a quality of milk of low nutritive powers, and dangerous to infants.

Colostrum.—The milk from cows soon after calving should not be sold. It has often produced intestinal troubles in children.

Cattle improperly cared for.—Cattle improperly housed and

cared for, especially those kept in cities, need close watching, and the stables should be frequently inspected.

Milk from diseased cattle.—Milk from diseased cows is especially dangerous, and we may assert that the use of this article from tuberculous cows is very hazardous. Sufficient evidence has been offered by good and careful authorities to prove that there is a possibility of the transmission of tuberculosis by means of the milk, and phthisis is quite a common disease among milch cows when crowded in ill-ventilated stables. Fortunately the secretion of milk is checked during many of the acute cattle diseases, but there is the risk of carelessness on the part of dairymen; hence inspectors should always be on the alert.

Finally, there is the great danger of the transmission of contagious diseases, the milk acting as the carrier. This fact has been carefully noted in England, and many epidemics of typhoid fever, scarlet fever, and diphtheria have been traced to the dairyman's house.

Mr. Ernest Hart, of London, has epitomized about all that is known on this subject in an article read by him before the International Medical Congress in 1881. He sums up as follows:

> The number of epidemics of typhoid fever recorded in the abstract as due to milk, is 50; of scarlatina, 15; of diphtheria, 7. The total number of cases occurring during the epidemics traced to the use of infected milk may be reckoned in round numbers as 3,500 of typhoid fever, 800 of scarlet fever, and 500 of diphtheria. When it is remembered that barely ten years ago we were utterly ignorant of milk's being a carrier of infection, and that consequently these epidemics have all occurred within one short decade, it will be seen how vitally important is the safe guarding of our milk supplies from contamination.

The last number of the *Lancet*, October, 1883 (No. 88, *p.* 652), records an epidemic of typhoid fever at St. Pancras, the details of the investigation being given by Mr. Murphy, Medical Officer. There were 431 cases in 276 houses, and 220 cases were traced back to a dairy which supplied most of the houses with milk.

We can easily account for the method of transmission in many cases. Thus, a can of milk—a fluid capable of absorbing all kinds of odors—may have been exposed to the emanations

from a case of scarlet fever, or the can wiped out with a soiled towel or cloth from the patient. The cases of typhoid fever traced to dairies have, as a rule, been accounted for by the contaminated water which has been used to dilute the milk or wash out the cans.

That the causes of the epidemics of some zymotic diseases have not been traced out in this country is probably due to want of care on the part of our sanitary officials.

I shall ask you now to consider a plan for a control of the milk supply, which I think should be followed by all sanitary officials. A registry of the milk dealers should be kept, backed up by law if necessary, and this should include the name of the dealer, the location of the farm, the amount of milk sold daily; and, after inspection of the farm and the milk, notes should be added as to the quality of the milk, the condition of the farmyards and the cattle, the breed of the herd, and the kind, quality, and quantity of feed given.

If this plan is followed out, it will not be long before a complete sanitary control can be kept over the milk supply. We are working on this plan in Paterson, but it is too early to arrive at results: so far it has worked well.

MEAT SUPPLY.

Most of our larger cities provide for meat inspection in their markets, but it begins and ends with the inspection of the meat actually exposed for sale, and as a rule only meagre, putrid, and immature meat is condemned. This system is defective in that it does not provide for the surveillance of slaughter-houses and the examination of all cattle before or immediately after killing, and before the meat is offered for sale.

In many of our cities the cattle are brought to the butcher by railroad, after a long journey: they arrive in an exhausted and feverish condition, frequently in a famished state, and are not fit to be used as food. In our smaller towns and villages only the very young or very old cattle are slaughtered for local use.

Not only are the cattle actually diseased at the time of killing, but the meat itself, by improper treatment, may act as a home for dangerous germs. Mr. Francis Vacher, of Birkenhead, in an able paper read before the International Medical

Congress, refers to several ways in which meat might spread diseases: thus, it might itself be in a pathological condition, or serve as a medium in which disease germs were nourished and multiplied, or it might serve as a nidus in which such germs rested. Thus, a specific disease may be communicated to man by the ingestion of meat tainted with splenic fever, or foot and mouth disease, or from a tuberculous animal.

We are warranted, then, in claiming that meat inspection should include an examination made by a competent person, before death or before the meat shall be exposed for sale in the markets. This plan may require the services of a skilled veterinarian, but it seems to me essential.

As many of our towns are now supplied almost entirely with meat killed and dressed in the West, and brought to market in refrigerator cars, this system of inspection will perhaps have to be followed by officials appointed by the general government, for it would not be equitable to burden a city with work which does not concern it.

ADDENDUM.

Since this essay was read before the American Public Health Association, at Detroit, November 14th, 1883, the following facts, in relation to milk acting as a carrier of disease, have come under the writer's notice, and are here added in order that the subject may be as complete as possible. The essay, besides being printed among the papers of the Association, was thought to be of sufficient importance to be published by the State Board of Health of New Hampshire, and on account of the manuscript being in the hands of the printer, at Concord, these recent notes could not be completed in time to go into the reprint, and this *addendum* is now inserted.

[NOTE.—These notes should be read before the words "We can easily account, etc.," at the foot of page 23.]

EPIDEMIC OF TYPHOID FEVER AT DUNDEE, SCOTLAND.—In this epidemic thirty-six cases occurred among the customers of one milkman. Upon investigation it was found that three of the man's children were sick with the disease in the room adjoining the "dairy."—*Lancet*, Oct. 27, 1883.

EPIDEMIC AT PENZANCE, ENGLAND.—Over thirty cases of typhoid fever were traced back to a case in the family of a dairyman.—*Lancet*, Jan., 1884.

EPIDEMIC AT ABERDEEN, SCOTLAND.—Sixteen cases of typhoid fever in nine families were caused by polluted milk from a dairy farm where there were cases of the disease.—*Lancet*, Jan., 1884.

EPIDEMIC AT ALLEGHENY CITY, PA.—This epidemic of typhoid fever is probably the first that has been traced to contaminated milk, as its cause, in this country. The record of the cases has not been published, but the writer is indebted to Mr. Joseph Albree, who kindly furnished very complete notes, which are endorsed by Dr. W. W. Jones, of Allegheny City. In this epidemic forty-eight cases of enteric fever occurred among the customers of one milkman, and were scattered over the city. There was but one case of the disease in the city which could not be traced to this man. An inspection of the dairy farm was made and the results are copied from Mr. Albree's notes: "A few feet from the upper door of the stable was a well which furnished all the water used on the premises. A short distance above this well, on the hill side, there was a large, deep privy, filled to the surface. The natural course of the surface drainage as well as the seeping through the earth led directly to the well. It was also discovered that a son of the milkman (whose dwelling was very near the privy) had been sick with typhoid fever. As there was no dairy building on the premises, it is supposed that the milk was kept in the house where the sick boy lay." The well water was analyzed and found to be badly polluted. The natural inference is that this man diluted his milk with the well water, or washed out the cans with it. A short paper on this

epidemic, by Dr. D. N. Rankin, is printed in the *Pittsburgh Medical Journal*, for October, 1883.

Epidemic at Port Jervis, N. Y.—This attracted a great deal of attention both in the lay and medical journals, and was investigated by Dr. F. C. Curtis for the State Board of Health of New York. Between Sept. 28th and Dec. 31st, 1883, there were 148 cases of enteric fever in Port Jervis, distributed pretty generally over the village. The cases occurred among the customers of one milkman to whose farm was traced the origin of the epidemic, there being typhoid fever in his family. Dr. Curtis sums up as follows: "The epidemic was one of true enteric fever; it made its appearance in a previously healthy locality; it arose suddenly and ended suddenly; it exhibited no local foci of infection; it affected several members of a large proportion of the affected families; 87 per cent. of the cases occurred among persons using the milk supplied by one milk vender; the possibility of the milk becoming infected from the cases of the disease at the dairy farm is established. I would report, therefore, that the epidemic was caused and spread through the medium of infected milk."—*Fourth Annual Report, State Board of Health of New York.*

Paterson, N. J., September, 1884.